WHAT IS CLAIMED IS:

1. A method for predicting an unknown value of an internal composition characteristic of a velvet antler of an animal, comprising the steps of:

selecting a sample population from a group of antlers;

obtaining at least one infrared thermographic image of each antler in the sample population, from at least one view, wherein the image is represented as an array of pixels providing temperature data representative of temperature information at the corresponding part of the image;

calculating a value of at least one statistical measure of the temperature data for the image, wherein the value is treated as the known input variable;

conducting an assay to obtain the known value of the composition characteristic;

determining a relationship between the known input variable and the known value of the composition characteristic, thereby generating a predictive model to predict the unknown value of the same composition characteristic in a test antler not selected from the sample population;

obtaining at least one infrared thermographic image of the test antler, from at least one view, wherein the image is represented as an array of pixels providing temperature data representative of temperature information at the corresponding part of the image;

calculating a value of at least one statistical measure of the temperature data for the image;

using the predictive model, wherein the unknown value of the composition characteristic is treated as an output variable, and the statistical measure of temperature data for the image is treated as an input variable; and

solving the predictive model to provide the value of the composition characteristic of the test antler.

2. The method of claim 1, wherein the composition characteristic is selected from the group consisting of moisture content, ash content, protein, fat, amino acids, growth factors, and location and amount of calcification.

3. The method of claim 1, wherein the composition characteristic is ash content.

4. The method of claim 2, further comprising the step of including in the predictive model, one or more input variables not derived from infrared thermography.

5. The method of claim 4, wherein the one or more input variables are selected from the group consisting of animal weight, animal age, species type, genetic breed, antler length, antler width, antler circumference, antler geometric measure, antler surface to volume ratio, button drop dates, time of year, and photoperiod.

6. The method of claim 5, wherein the animal is selected from the group consisting of *Cervus elaphus manitobensis*, *Cervus elaphus nelsoni*, *Cervus elaphus roosovelti*, *Cervus elaphus scoticus*, *Cervus elaphus xanthopygus*, *Cervus canadensis*, *Cervus hortulorum*, *Cervus nippon*, *Cervus timorensis russa*, *Cervus unicolor*, *Cervus timorensis*, *Cervus mariannus*, *Cervus duvauceli*, *Cervus schomburgki*, *Cervus eldi*, *Cervus albirostris*, *Alces alces*, *axis axis*, *Blastocerus dichotomus*, *Capreolus capreolus*, *dama dama*, *Elaphurus davidianus*, *Hippocamelus antisensis*, *H. bisulcus*, *Mazama americana*, *M. gouazoubira*, *M. rufina*, *M. chunyi*, *Odocoileus hemionus*, *Odocoileus virginianus*, *Ozotoceros bezoarticus*, *Pudu pudu*, *Pudu mephistophiles*, and *Rangifer tarandus*.

7. The method of claim 6, wherein the view of the image is a dorsal, lateral, distal, or proximal view.

8. The method of claim 7, wherein the statistical measure is selected from the group consisting of a measure of central tendency, a measure of dispersion, and a total temperature.

9. The method of claim 7, wherein the statistical measure is the mean temperature.

10. The method of claim 8, wherein the relationship between the known input variable and the known value for the composition characteristic is determined by a statistical technique selected from the group consisting of multiple linear regression, cluster analysis, discriminate analysis, curve fitting, ranking and artificial neural network learning, Spearman ranking, and visual subjective scores.

11. The method of claim 10, wherein the image is obtained from the antler *in vivo* or *in vitro*.

12. The method of claim 10, wherein the image is obtained from the antler *in vivo* or *in vitro* and when subjected to a temperature change.

13. The method of claim 12, wherein the temperature change is cooling.

14. The method of claim 12, wherein the temperature change is warming.

15. The method of claim 13, further comprising the steps of:

obtaining the image of the antler *in vitro* from at least one view, within a first time period after removal from the animal;

obtaining at least one second infrared thermographic image of the antler *in vitro* from the same view at a second time period after cooling of the antler;

calculating a value of at least one statistical measure of the temperature data for the first image and the second image, wherein the temperature data represent one or more sites within the antler;

calculating a value of a temperature change at the one or more sites within the antler;

using the predictive model, wherein the value of the temperature change is treated as an input variable; and

solving the predictive model to identify the one or more sites of high calcification and low metabolic activity within the antler.

16. The method of claim 14, further comprising the steps of:

obtaining the image of the antler *in vitro* from at least one view, within a first time period after freezing of the antler;

obtaining at least one second infrared thermographic image of the antler *in vitro* from the same view at a second time period after warming of the antler;

selecting one or more sites within the antler for analysis of temperature data;

calculating a value of at least one statistical measure of the temperature data at the one or more sites in the first image and the second image;

calculating a value of a temperature change at the one or more sites within the antler; and

using the predictive model, wherein the value of the temperature change is treated as an input variable; and

solving the predictive model to identify the one or more sites of high calcification and low metabolic activity within the antler.

17. The method of claim 11, further comprising the step of using the value of the composition characteristic to make a map of the antler, wherein the map indicates sites of high and low levels of the composition characteristic within the antler.

18. The method of claim 11, further comprising the step of comparing the value of the composition characteristic to a pre-determined value of the composition characteristic to determine optimal harvest timing.

19. The method of claim 18, wherein the composition characteristic is ash content.

20. The method of claim 11, further comprising the steps of:

using the predictive model to determine a physical volume of one or more sites of low temperature;

determining the physical volume of the antler; and

calculating the percentage by volume of the antler displaying the one or more sites of low temperature.

21. A method for predicting an internal composition characteristic of a velvet antler, comprising the steps of:

obtaining at least one infrared thermographic image of the antler, from at least one view, wherein the image is represented as an array of pixels providing temperature data representative of temperature information at the corresponding part of the image; and

scoring the image by comparing the temperature information of the image to the temperature information of a corresponding image of an antler with a known value for the composition characteristic.

22. The method of claim 21, wherein scoring is conducted visually or by computing means.

23. The method of claim 22, wherein the composition characteristic is ash content.

24. The method of claim 23, wherein the animal is selected from the group consisting of *Cervus elaphus manitobensis*, *Cervus elaphus nelsoni*, *Cervus elaphus roosovelti*, *Cervus elaphus scoticus*, *Cervus elaphus xanthopygus*, *Cervus canadensis*, *Cervus hortulorum*, *Cervus nippon*, *Cervus timorensis russa*, *Cervus unicolor*, *Cervus timorensis*, *Cervus mariannus*, *Cervus duvauceli*, *Cervus schomburgki*, *Cervus eldi*, *Cervus albirostris*, *Alces alces*, *axis axis*, *Blastocerus dichotomus*, *Capreolus capreolus*, *dama dama*, *Elaphurus davidianus*, *Hippocamelus antisensis*, *H. bisulcus*, *Mazama americana*, *M. gouazoubira*, *M. rufina*, *M. chunyi*, *Odocoileus hemionus*, *Odocoileus virginianus*, *Ozotoceros bezoarticus*, *Pudu pudu*, *Pudu mephistophiles*, and *Rangifer tarandus*.

25. The method of claim 24, wherein the view of the image is a dorsal, lateral, distal, or proximal view

26. A method for predicting maturity of a velvet antler *in vivo*, comprising the steps of:

at a first time period, obtaining at least one infrared thermographic image of the tip of the antler, and at least one infrared thermographic image of the base of the antler, from at least one view, wherein each image is represented as an array of pixels providing temperature data representative of temperature information at the corresponding part of the image;

at a second time period, obtaining at least one infrared thermographic image of the tip of the antler, and at least one infrared thermographic image of the base of the antler, from the same view;

calculating a value of at least one statistical measure of the temperature data of the tip of the antler and the base of the antler, at the first time period and the second time period;

calculating a value of the temperature change of the tip of the antler and the base of the antler at the first and second time periods; and

harvesting the antler before the temperature change of the tip of the antler is equal to the temperature change of the base of the antler.

27. The method of claim 26, wherein the animal is selected from the group consisting of *Cervus elaphus manitobensis*, *Cervus elaphus nelsoni*, *Cervus elaphus roosovelti*, *Cervus elaphus scoticus*, *Cervus elaphus xanthopygus*, *Cervus canadensis*, *Cervus hortulorum*, *Cervus nippon*, *Cervus timorensis russa*, *Cervus unicolor*, *Cervus timorensis*, *Cervus mariannus*, *Cervus duvauceli*, *Cervus schomburgki*, *Cervus eldi*, *Cervus albirostris*, *Alces alces*, *axis axis*, *Blastocerus dichotomus*, *Capreolus capreolus*, *dama dama*, *Elaphurus davidianus*, *Hippocamelus antisensis*, *H. bisulcus*, *Mazama americana*, *M. gouazoubira*, *M. rufina*, *M. chunyi*, *Odocoileus hemionus*, *Odocoileus virginianus*, *Ozotoceros bezoarticus*, *Pudu pudu*, *Pudu mephistophiles*, and *Rangifer tarandus*.

28. The method of claim 27, wherein the view of the image is a dorsal, lateral, distal, or proximal view

29. The method of claim 28, wherein the statistical measure is selected from the group consisting of a measure of central tendency, a measure of dispersion, and a total temperature.

30. The method of claim 28, wherein the statistical measure is the mean temperature.

31. The method of claim 29, wherein the image is obtained from the antler *in vivo* or *in vitro*.

32. The method of claim 29, wherein the image is obtained from the antler *in vivo* or *in vitro* and when subjected to a temperature change.

33. The method of claim 32, wherein the temperature change is cooling.

34. The method of claim 32, wherein the temperature change is warming.

35. An apparatus for predicting an internal composition characteristic of a velvet antler comprising:

a) image acquisition means for scanning the live animal or harvested antler from at least one view to obtain at least one infrared thermographic image of the animal or antler, whereby each image is represented as an array of pixels providing temperature data representative of temperature information at the corresponding part of the image; and

b) computing and storing means for:

i) storing each image as an array of pixels providing temperature data representative of temperature information at the corresponding part of the image;

ii) calculating a value of at least one statistical measure of the temperature data for each thermographic image;

iii) providing a predictive model, whereby the composition characteristic is treated as an output variable, and the statistical measure of temperature data is treated as an input variable; and

iv) solving the predictive model to provide the value of the composition characteristic; and,

c) output means for furnishing the value of the composition characteristic for the antler.

36. The apparatus of claim 35, wherein the composition characteristic is selected from the group consisting of moisture content, ash content, protein, fat, amino acids, growth factors, and location and amount of calcification.

37. The apparatus of claim 35, wherein the composition characteristic is ash content.

38. The apparatus of claim 36, further comprising one or more input variables not derived from infrared thermography.

39. The apparatus of claim 38, wherein the one or more input variables are selected from the group consisting of animal weight, animal age, species type, genetic breed, antler length, antler width, antler circumference, antler geometric measure, antler surface to volume ratio, button drop dates, time of year, and photoperiod.

40. The apparatus of claim 38, wherein the statistical measure is selected from the group consisting of a measure of central tendency, a measure of dispersion, and a total temperature.

41. The apparatus of claim 38, wherein the statistical measure is the mean temperature.